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(71) Applicant(s)  
**Behavior Tech Computer Corporation**  
(Incorporated in Taiwan)  
2F 51 Tung-Hsing Street, Taipei, Taiwan

(72) Inventor(s)  
**Lun Wang**

(74) Agent and/or Address for Service  
**Mewburn Ellis**  
York House, 23 Kingsway, LONDON, WC2B 6HP,  
United Kingdom

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**G06F 13/12**

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(56) Documents Cited  
**GB 2324177 A**  
**US 5996082 A**

(58) Field of Search  
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(54) Abstract Title  
**Wireless USB-based remote wake-up device**

(57) A wireless remote wake-up device, comprising a CPU, which is adapted to be attached to a transmitter of a USB-based wireless peripheral device of a computer system. The device is able to transmit a wake-up signal on a predetermined channel to drive the computer from power-saving mode.

The device also contains a power supply system which houses a battery system and a solar energy system. The battery system provides power to the peripheral device and the wake-up device during normal operation and the solar energy system supplies power during the power saving mode and during a wake-up operation.

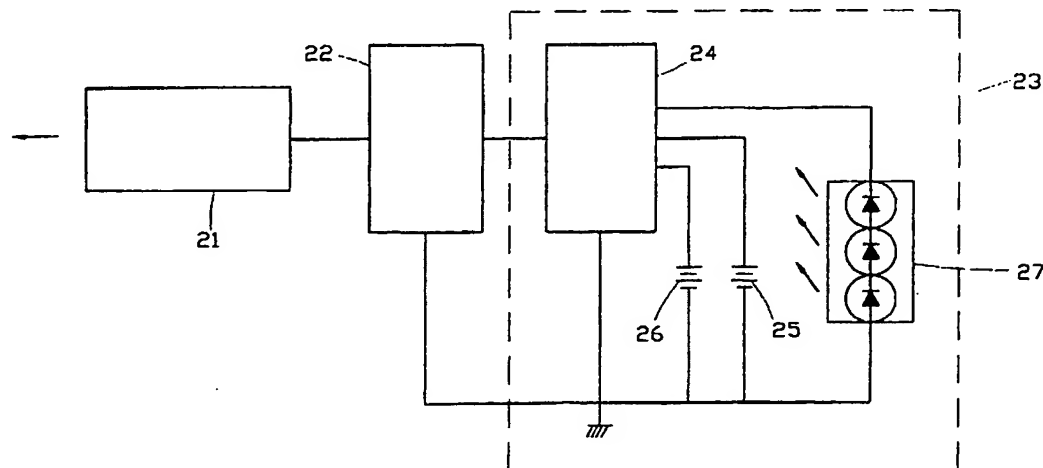


FIG.2

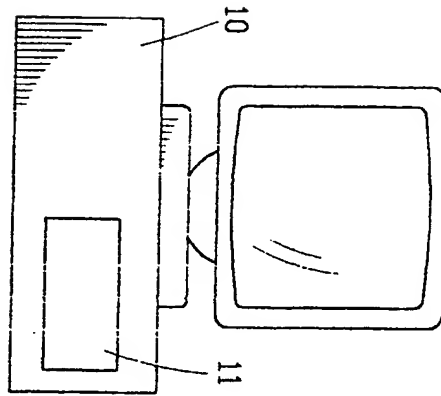
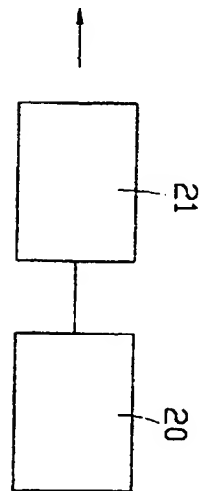


FIG. 1



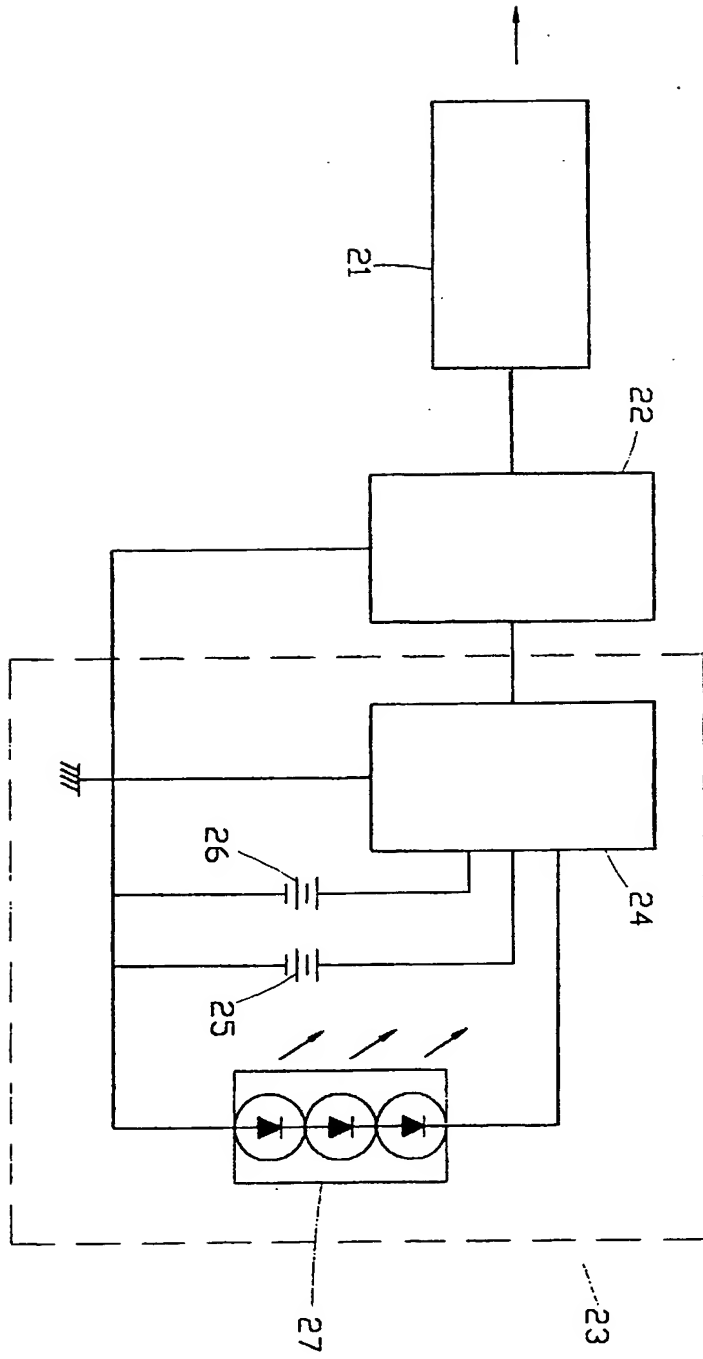


FIG.2

## WIRELESS USB-BASED REMOTE WAKE-UP DEVICE

The present invention generally relates to a computer system, and in particular to a wireless USB (Universal Serial Bus) based remote wake-up  
5 device of a computer.

Conventionally, a computer communicates with peripheral devices via cables or wires. The cable or wire that connects a peripheral device to a computer interferes with the activity of a computer user and limits the  
10 operation of some peripheral devices. For example, the operation of a mouse may be restricted by the cable thereof.

Wireless connection between a peripheral device and a computer solves the problem. One example of the wireless connection is a USB (Universal Serial Bus) based wireless connection. A USB  
15 communication interface is incorporated in the computer while a counterpart transmitter is added in the peripheral device whereby USB based signals are transmitted between the peripheral device and the computer, allowing a user to control the computer via the peripheral device in a wireless fashion.

20 However, a wireless peripheral device must have an independent power supply for supporting regular operations thereof. A wireless peripheral device usually uses a primary battery set or a secondary (rechargeable battery set) as the power supply thereof. Although power consumption of a wireless peripheral device is limited, the battery set may  
25 still be exhausted sooner or later. Once the battery set is consumed and/or dead, it must be replaced. This causes troubles to a computer user

especially when a replacement battery is not immediately available.

Furthermore, for the sake of saving power, a computer is usually allowed to enter a suspend (power saving) mode when it has not been in operation for a predetermined period of time. A conventional peripheral device, such as a keyboard, that is cable-connected to the computer is capable to wake up the computer when a user actuates any key thereof. The conventional USB based signal transmission system, however, is not capable to wake up a computer when the computer is in the suspend mode.

It is thus desirable to have a wireless USB-based remoter wake-up device which consumes less power of a peripheral device while allows a computer wirelessly connected to the peripheral device to be waken up by the peripheral device.

Accordingly, an object of the present invention is to provide a wireless remote wake-up device for waking up a computer host.

Another object of the present invention is to provide a wireless remote wake-up device which has an extended service life by being powered by a solar cell unit.

To achieve the above objects, in accordance with the present invention, there is provided a wireless remote wake-up device adapted to be coupled to a transmitter of a USB-based wireless peripheral device of a computer system for transmitting a wake-up signal to a receiver of a computer host of the computer system to perform a wake-up operation which drives the computer host from a power saving mode to a normal mode. The wake-up device comprises a central processing unit controlling a predetermined channel of the transmitter for transmitting the

wake-up signal and a power supply system powering the central processing unit. The power supply system comprises a power controller to which a battery system including a primary battery set and a secondary battery set and a solar energy system are connected. The battery system  
5 supports the normal mode of the computer system, while the solar energy system continuously supply power to support the power saving mode of the computer system and the wake-up operation thereof whereby the computer system may be waken up by a user operating the peripheral device.

10

The present invention will be apparent to those skilled in the art by reading the following description of a preferred embodiment thereof, with reference to the accompanying drawings, in which:

Figure 1 is a schematic view of a computer system in which a  
15 wireless remote wake-up device constructed in accordance with the present invention is incorporated; and

Figure 2 is a circuit, in block form, of the wireless remote wake-up device of the present invention.

20 With reference to the drawings and in particular to Figure 1, a computer system comprising a computer host 10 and a peripheral device 20 is shown. A wireless remote wake-up device constructed in accordance with the present invention is incorporated in the computer system, comprising a peripheral side transmitter 21 electrically coupled to  
25 the peripheral device 20 and a host side receiver 11 electrically coupled to the computer host 10. In a preferred embodiment of the present

invention, the transmitter 21 and the receiver 11 are USB (Universal Serial Bus) based which allows wireless coupling between the peripheral device 20 and the computer host 10.

5 The peripheral device 20 may be any known computer peripheral devices, including, but not limited to, a keyboard, a mouse, a joystick, a writing pad and a game pad. The peripheral device 20 is connected to the USB-based transmitter 21 for transmitting control/data signals to the receiver 11 which sends the signals to the computer host 10.

Also referring to Figure 2, wherein the wireless remote wake-up  
10 device of the present invention is shown, the remote wake-up device of the present invention comprises a central processing unit 22 to which a power supply system 23 is coupled. The power supply system 23 provides the required operation power to the remote wake-up device of the present invention and the peripheral device 20 for driving the transmitter 21 to  
15 transmit the signals from the peripheral device 20 to the receiver 11 of the computer host 10 and thus allowing the peripheral device 20 to control the computer host 10 in a wireless fashion.

The power supply system 23 comprises a controller 24 connecting a primary battery set 25, a secondary (rechargeable) battery set 26 and the  
20 solar cell unit 27 to the central processing unit 22 for controlling power supplied to the central processing unit 22 by the battery sets 25, 26 and the solar cell unit 27. The primary battery set 25 and the secondary battery set 26, serving as a main power supply of the peripheral device 20, supply direct current (DC) to the central processing unit 22 via the controller 24  
25 for supporting a normal operation mode of the peripheral device 20. The solar cell system 27 serves as an auxiliary power supply which continuously supplies power to the central processing unit 22 for supporting a power-saving, suspend mode of the peripheral device 20.

The transmitter 21 is powered by the power supply system 23. In the normal operation mode, the battery sets 25, 26 supply power to the central processing unit 22 to support the communication between the computer host 10 and the peripheral device 20.

5 When the computer host 10 is not in operation for a predetermined period of time, the computer host 10 and the peripheral device 20 enter the power-saving, suspend mode for reducing power consumption. In this mode, the power is supplied to the central processing unit 22 by the solar cell unit 27 whereby the power consumption of the batteries 25, 26 are cut  
10 off and the service life thereof may thus be extended.

In accordance with the present invention, a channel of the transmitter 21 is reserved and controlled by the central processing unit 22 for remote wake-up operation. When a user actuates the peripheral device 20, a wake-up signal is transmitted through the wireless coupling between the  
15 transmitter 21 and the receiver 11 to the computer host 10 for driving the computer host 10 back to the normal operation mode.

Since the power required for performing the wake-up operation by the remote wake-up device is small, the solar cell unit 27 is capable to supply sufficient power. The power of the batteries 25, 26 is not  
20 consumed in the wake-up operation. Their power may thus be further preserved.

Although the present invention has been described with reference to the preferred embodiment thereof, it is apparent to those skilled in the art that a variety of modifications and changes may be made without departing  
25 from the scope of the present invention which is intended to be defined by the appended claims.



## CLAIMS

1. A wireless remote wake-up device adapted to be coupled to a transmitter of a USB-based wireless peripheral device of a computer system for transmitting a wake-up signal to a computer host of the computer system for waking up and driving the compute system from a power saving mode to a normal operation mode, the wake-up device comprising a central processing unit controlling a predetermined channel of the transmitter for transmitting the wake-up signal and a power supply system comprising a power controller to which a battery system and a solar energy system are connected, the battery system supporting the normal operation mode of the computer system, while the solar energy system continuously supplying power to support the power saving mode of the computer system and the wake-up operation.
2. The wireless remote wake-up device as claimed in Claim 1, wherein the peripheral device comprises a computer peripheral device selected from the group including a keyboard, a mouse, a joystick, a writing pad and a game pad.

Amended claims have been filed as follows

Claims:

1. A wireless remote wake-up device adapted to be coupled to a transmitter of a USB-based wireless peripheral device of a computer system for transmitting a wake-up signal to a computer host of the computer system for waking up and driving the computer system  
5 from a power saving mode to a normal operation mode, the wake-up device comprising a central processing unit controlling a predetermined channel of the transmitter for transmitting the wake-up signal and a power supply system comprising a power controller to which a battery system and a solar energy system are connected, the battery system being adapted to support the wireless peripheral device of the computer system in the normal  
10 operation mode of the computer system, while the solar energy system is being arranged to supply power continuously to the wake-up device to support the wake-up operation..

2. A wireless remote wake-up device as claimed in Claim 1, wherein the peripheral device comprises a computer peripheral device selected from the group including a  
15 keyboard, a mouse, a joystick, a writing pad and a game pad.

3. A wireless remote wake-up device substantially as herein described with reference to and as illustrated in the accompanying drawings.



INVESTOR IN PEOPLE

Application No: GB 0019275.7  
Claims searched: 1 - 2

Examiner: Natasha Chick  
Date of search: 29 March 2001

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.S): G4A AFGN AKS  
Int Cl (Ed.7): G06F 13/12  
Other: Online: EPODOC, WPI, PAJ, IEL, ELSEVIER

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2324177 A Samsung Electro-Mechanics Co Ltd	
A	GB 2291722 A International Business Machines Corp.	
A	US 5996082 A Cortopassi	

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X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.

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